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11/25/2025

Tractian Technologies, Inc.
201 17th St. NW, Ste. 200
Atlanta, GA 0363
USA

Dear Jorge Sousa,

Enclosed is the EMC test report for testing of the Tractian Technologies, Inc., Smart Trac Ultra Gen2, tested to the requirements of FCC Part 2.1091

Thank you for using the services of Eurofins E&E North America. If you have any questions regarding these results or if MET can be of further service to you, please do feel free to contact me.

Sincerely,

Nancy LaBrecque
Documentation Department
Eurofins Electrical and Electronic Testing NA, Inc.

Reference: WIRA138806-MPE_FCC

A2LA ACCREDITED TESTING CERT #0591.06

Eurofins MET Laboratories Inc. (Eurofins E&E North America) is part of the Eurofins Electrical & Electronics (E&E) global compliance network.

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RF Exposure Criteria
Test Report
Using Maximum Permissible Exposure (MPE) Calculations

for the

Tractian Technologies, Inc.
Smart Trac Ultra Gen2

Tested under

FCC Part 2.1091

Report: WIRA138806-MPE_FCC

11/25/2025

Prepared For:

Tractian Technologies, Inc.
201 17th St. NW, Ste. 200
Atlanta, GA 0363
USA

Prepared By:
Eurofins E&E North America
13501 McCallen Pass,
Austin, TX 78753

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Bryan Taylor, Wireless Team Lead
Electromagnetic Compatibility Lab

Nancy LaBrecque
Documentation Department

Engineering Statement: The measurements shown in this report were made in accordance with the procedures indicated, and the emissions from this equipment were found to be within the limits applicable. I assume full responsibility for the accuracy and completeness of these measurements, and for the qualifications of all persons taking them.

Report Status Sheet

Revision	Report Date	Reason for Revision
0	11/25/2025	Initial Issue.

List of Terms and Abbreviations

AC	**A**lternating **C**urrent
ACF	**A**ntenna **C**orrection **F**actor
Cal	**Cal**ibration
d	**M**easurement **D**istance
dB	**D**eci**b**els
dBµA	**D**eci**b**els above one **micro**amp
dBµV	**D**eci**b**els above one **micro**volt
dBµA/m	**D**eci**b**els above one **micro**amp **per m**eter
dBµV/m	**D**eci**b**els above one **micro**volt **per m**eter
DC	**D**irect **C**urrent
E	**E**lectric Field
DSL	**D**igital **S**ubscriber **L**ine
ESD	**E**lectro**s**tatic **D**ischarge
EUT	**E**quipment **U**nder **T**est
f	**F**requency
CISPR	**C**omite **I**nternational **S**pecial des **P**erturbations **R**adioelectriques (International Special Committee on Radio Interference)
GRP	**G**round **R**eference **P**lane
H	Magnetic Field
HCP	**H**orizontal **C**oupling **P**lane
Hz	**H**ertz
IEC	**I**nternational **E**lectrotechnical **C**ommission
kHz	**k**ilo**H**er**z**
kPa	**k**ilo**Pa**scal
kV	**k**ilovolt
LISN	**L**ine **I**mpedance **S**tabilization **N**etwork
MHz	**M**ega**H**ertz
µ**H**	**micro**H**enry**
µ**F**	**micro**F**arad**
µ**s**	**micros**econds
PRF	**P**ulse **R**epetition **F**requency
RF	**R**adio **F**requency
RMS	**R**oot-**M**ean-**S**quare
V/m	**V**olts **per m**eter
VCP	**V**ertical **C**oupling **P**lane

1.0 Requirements Summary

Page Number	Test Name	Result
10	FCC Part 2.1091 MPE Limits (For General Public Exposure)	**Compliant**

Table 1. Summary of Test Results

2.0 Equipment Configuration

2.1 Overview

Eurofins E&E North America was contracted by Tractian Technologies, Inc. to perform testing on the Smart Trac Ultra Gen2.

This document describes the test setups, test methods, required test equipment, and the test limit criteria used to perform compliance testing of the Tractian Technologies, Inc. Smart Trac Ultra Gen2.

The results obtained relate only to the item(s) tested.

Product Name:	Smart Trac Ultra Gen2	
Model(s) Tested:	STUG2	
Primary Power	3.6VDC	
BLE Radio Specifications	Type of Modulations:	GFSK
	Max Rated Output	11dBm
	EUT Frequency Ranges:	2402 – 2480MHz
	Antenna Gain[1]:	4.2dBi
Sub-1GHz Radio (802.15.4)	Type of Modulations:	OQPSK
	Max Rated Output	17dBm
	EUT Frequency Ranges:	903 – 927MHz
	Antenna Gain[1]:	2.1 dBi
Analysis:	The results obtained relate only to the item(s) tested.	
Environmental Test Conditions:	Temperature: 15-35º C	
	Relative Humidity: 30-60%	
	Barometric Pressure: 860-1060 mbar	
Evaluated by:	Bryan Taylor	
Test Date(s):	9/8/2025 through 10/24/2025	

Table 2. EUT Summary Table

[1] The antenna gain information was provided by Tractian Technologies, Inc. and may affect compliance.

2.2 Test Site

All testing was performed at Eurofins E&E North America, Austin, TX. All equipment used in making physical determinations is accurate and bears recent traceability to the National Institute of Standards and Technology.

2.3 References

FCC Part 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.

Table 3. References

2.4 Description of Test Sample

The Smart Trac Ultra Gen2 is an internal battery powered 802.15.4 and BLE Industrial IoT sensor of vibration and temperature.

2.5 Modifications

2.5.1 Modifications to EUT

No modifications were made to the EUT.

2.5.2 Modifications to Test Standard

No modifications were made to the test standard.

2.6 Disposition of EUT

The test sample including all support equipment submitted to the Electro-Magnetic Compatibility Lab for testing was returned to Tractian Technologies, Inc. upon completion of testing.

3.0 Maximum Permissible Exposure Results

3.1 FCC Exposure Limits

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(i) Limits for Occupational/Controlled Exposure				
0.3-3.0	614	1.63	*(100)	≤6
3.0-30	1842/f	4.89/f	*($900/f^2$)	<6
30-300	61.4	0.163	1.0	<6
300-1,500			f/300	<6
1,500-100,000			5	<6
(ii) Limits for General Population/Uncontrolled Exposure				
0.3-1.34	614	1.63	*(100)	<30
1.34-30	824/f	2.19/f	*($180/f^2$)	<30
30-300	27.5	0.073	0.2	<30
300-1,500			f/1500	<30
1,500-100,000			1.0	<30

f = frequency in MHz. * = Plane-wave equivalent power density.

Test Procedure:

An MPE evaluation for was performed in order to show that the device was compliant with the general population exposure limits ICNIRP. The maximum power density was calculated for each transmitter band at a separation distance of 20cm using the maximum declared output power including tune up tolerance.

For each transmitter the maximum RF exposure at a 20 cm distance using the formula:

$$ConductedPower_{mW} = 10^{ConductedBwer(dBm)/10}$$

$$PowerDensity = \frac{ConductedPower_{mW} \times Ant.Gain}{4\pi \times (20_{cm})^2}$$

For transmitters that could operate simultaneously, the MPE to limit ratio for each was calculated and then summed. If the sum of the MPE to limit ratios was less than 1, that specific combination of transmitters was deemed to comply.

Test Results:

The Smart Trac Ultra Gen2 was **compliant** with IEC62311:2019. The calculated maximum power density at 20cm distance was equal to or less than the required limits for general population exposure for IEC62311: 2019.

FCC Test Data:

Duty Cycle	100 (%)							
Separation Dist.	20 (cm)							
Operating Mode	Frequency (MHz)	Declared Max Cond. Power (Inc. Tolerance) (dBm)	Duty Cycle Adjusted Cond. Output Power (dBm)	Antenna Gain (dB)	MPE Value (mW/cm^2)	MPE Limit (mW/cm^2)	Margin to Limit (mW/cm^2)	MPE / Limit Ratio (for Co-Location)
Sub-1GHz Transmitter	902.00	17.00	17.00	2.10	0.0162	0.6013	0.5852	0.0269
BLE	2402.00	11.00	11.00	4.20	0.0066	1.0000	0.9934	0.0066
							Sum:	0.0335

Test Engineer(s): Bryan Taylor

Test Date(s): 10/24/2025

Test Equipment

Calibrated test equipment utilized during testing was maintained in a current state of calibration per the requirements of ISO/IEC 17025:2017.

Asset #	Description	Manufacturer	Model	Last Cal Date	Cal Due Date
1A1250	Receiver	Rohde & Schwarz	ESW44	03/28/2025	03/28/2026
1A1234	FSV Signal Analyzer	Rohde & Schwarz	FSV 40	03/13/2025	03/13/2026
1A1176	Active Loop Antenna (9KHz-30MHz)	ETS-Lindgren	6502	08/22/2024	08/22/2026
1A1050	Bi-Log Antenna	Schaffner	CBL-6112D	03/05/2024	03/05/2026
1A1183	Double Ridged Waveguide Antenna	ETS Lindgren	3117	02/20/2024	02/20/2026
1A1161	Horn Antenna (18GHz – 40GHz)	ETS Lindgren	3116C	08/01/2024	08/01/2026
1A1088	Preamplifier	Rohde & Schwarz	TS-PR1	See Note	
1A1044	Generator	Com-Power	CG-520	See Note	
1A1073	Multi Device Controller	ETS	2090	See Note	
1A1074	System Controller	Panasonic	WV-CU101	See Note	
1A1080	Multi-Device	ETS	2090	See Note	
1A1180	Preamplifier	Miteq	AMF-7D-01001800-22-10P	See Note	

Note: Functionally verified test equipment is verified using calibrated instrumentation at the time of testing.

Table 4. Test Equipment